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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,773	08/21/2003	Hidehiko Kawaguchi	KAMMON 3.0-069 CONT	8770
530 7590 01/17/2008 LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			EXAMINER CARRILLO, BIBI SHARIDAN	
			ART UNIT	PAPER NUMBER
			1792	
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			01/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/645,773

Applicant(s)

KAWAGUCHI ET AL.

Examiner

Sharidan Carrillo

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8 and 12-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8 and 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/5/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 8, and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by King (4599116).

King teaches a method of employing an aqueous alkaline cleaner for cleaning of aluminum container surfaces. King teaches that it is desirable to subsequently rinse an alkaline cleaned surface with an aqueous based neutral or acidulated rinse solution at a controlled pH to remove residual cleaning solution there from where after it is subjected to further treatments as may be desired or required. In order to avoid any buildup in alkalinity, it is been found necessary to effect an overflow of the rinse and or a neutralization of alkaline buildup such as by the addition of an acid to maintain the pH of the rinse solution at a pH about 7. Re claims 1 and 8, King teaches acid addition occurring after the substrate is rinsed, in order to neutralize the rinse water in subsequent rinse solutions and the predetermined period of time is the time from the start of the rinse to the time you start adding the acid to neutralize the rinse solution (col. 7, lines 18-35). By maintaining the subsequent water rinse solutions at a neutral or acid pH, the formation of brown stains on the aluminum container bodies is substantially

eliminated (col. 7, lines 15-37, col. 12, lines 1-12). Further, the teaching of neutralizing "subsequent water rinse solutions" further support the teaching of adding acid to the water after rinsing the substrate with water for a predetermined period of time. Example 4 teaches continuous rinses in a pilot washer. In col. 6, lines 50-51 teach contacting of the substrate by immersion. The limitations of producing of salt would inherently be met by the teachings of King since King teaches performing the same method steps. Additionally, it is notoriously well known in the art that salts are produced by acid-base reactions (6759184, 6489353). In reference to claim 2, refer to col. 7, lines 20-30. In reference to claims 17-18, King teaches in col. 12, lines 5-10 of adding an amount of acidic component to the rinse solution.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 1-2, 5-8, 12, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olesen et al. (5656097).

Olesen et al. teach a wafer cleaning system. Olsen teach a cleaning tank subjected to sequential flows of one or more diluted cleaning solutions that are injected from the lower end of tank and allowed to overflow to the upper end. Olesen et al. teach cleaning with ammonium hydroxide/hydrogen peroxide/ water, followed by rinsing with cold DI water (col. 4, lines 1-20). Olesen teaches injecting small amount of HF into cold DI water stream (col. 4, lines 45-50) to create the desired concentration of HF for etching (col. 11, lines 45-55). In reference to claims 1, 7-8, and 15, Olesen teaches cleaning with ammonium hydroxide/hydrogen peroxide/ water mixture, followed by rinsing with cold DI water. After a predetermined period of time, acid is added to the

rinse bath . Col. 4, lines 17-18 teaches continuing the cold DI water flow. Further, refer to the embodiment of Fig. 9. During Vc1, 6-7.5 minutes, the NH_4OH /peroxide/surfactant water mixture is added to the substrate surface. At Vc1 (from 9-16 minutes), a low-flow cold DI water is added to the substrate surface. At 12-13 minutes, the BOE acid is added to the cold DI water. In summary, Olesen teaches adding the ammonium hydroxide mixture, followed by only the cold DI water, which occurs at 9 minutes, and at 12-13 minutes the acid is added to the cold DI water rinse. Olesen further teaches overflowing the cleaning solution to the overflow weir 17 and directing it to a drain 23. Olesen fails to teach forming a salt. However, one would reasonably expect a salt to be produced by reaction of the acid with the basic cleaning solution since it is notoriously well known in the art that salts are produced by acid/base reactions (6759184, 6489353). In reference to claim 2, Olesen teaches contacting the wafer with the HF diluted in cold DI water rinse. In reference to claims 5-6, and 12, Olesen teaches that it is conventional in the art to use SC1 and SC2 solutions in the semiconductor manufacturing process. In col. 9, lines 63-65, Olesen teaches Piranha cleaning using sulfuric acid/hydrogen peroxide mixture in combination with the ammonium hydroxide/hydrogen peroxide mixture. In reference to claim 16, it would have been obvious to a person of ordinary skill in the art to use the method of Olesen to clean LCD since Olesen teaches using the method to clean wafers and circuit devices. In reference to claims 17-18, Fig. 5 teaches a concentration of BOE.

7. Claims 13-14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olesen et al. (5656097) as applied to claims 1-2, 5-8, 12, and 15-18 as described in paragraph 6 above, and further in view of Kennison et al. (3898351).

Olesen et al. teach the invention substantially as claimed with the exception of the limitations of claims 13-14 and 19. Specifically, Olsen et al. fail to teach measuring the resistivity of the rinse bath to determine the completion of the rinsing. Kennison et al. teach cleaning substrates used in the fabrication of integrated circuits. In col. 3, lines 39-55, Kennison teaches measuring the resistivity in the rinse water in order to determine whether the rinse is adequate. Kennison further teaches setting a resistivity level, such as 12 megaohms, to assure completeness of the rinse. It would have been obvious to a person of ordinary skill in the art to have modified the method of Olesen et al. to include, measuring the resistivity of the rinse bath, as taught by Kennison, for purposes of determining the completeness of the rinsing step.

Response to Arguments

8. Applicant argues that the claims are not anticipated by King. Specifically, applicant argues that King fails to teach the addition of a neutralizing chemical liquid to neutralize the cleaning chemical after the predetermined period of time has elapsed and during the continuous feeding of the pure water. Applicant argues that King fails to teach the timing of addition of neutralizing chemical to the rinse. As discussed previously in paragraph 2 above. Specifically, in order to avoid any buildup in alkalinity, it is been found necessary to "effect an overflow of the rinse" and or a neutralization of

alkaline buildup such as by the addition of an acid to maintain the pH of the rinse solution at a pH about 7. King teaches acid addition occurring after the substrate is rinsed, in order to neutralize the rinse water (col. 7, lines 18-35). By maintaining the subsequent water rinse solutions at a neutral or acid pH, the formation of brown stains on the aluminum container bodies is substantially eliminated (col. 7, lines 15-37, col. 12, lines 1-12). Further, the teaching of neutralizing "subsequent water rinse solutions" further support the teaching of adding acid to the water after rinsing the substrate with water for a predetermined period of time.

9. Applicant argues that the claims are not unpatentable over Olesen. Specifically, applicant argues that Olesen fails to teach the addition of a neutralizing chemical liquid to neutralize the cleaning chemical after the predetermined period of time has elapsed and during the continuous feeding of the pure water. Applicant argues that Olesen fails to teach the timing of addition of neutralizing chemical to the rinse. Applicant argues that the HF or BOE is injected into the cold DI water in the Vc2 cycle so as not to neutralize the chemicals used in the preceding step Vc1, but instead to remove native oxides from the wafer by etching. Applicant's arguments are unpersuasive for the following reasons. Col. 14, lines 63-68 and col. 15, lines 1-26 teach that the cleaning chemical liquid (i.e. Vc1) has a pH of almost 10. The introduction of the BOE (i.e. HF) to the rinse reduces the pH since the BOE has a neutral pH. Additionally, col. 15, lines 1-20 teaches that the rinses reduce the pH to about 7.6. Therefore, there is a drop in pH, as a result of rinsing and the pH is further lowered as a result of the BOE acid. Furthermore, the skilled artisan would reasonably expect the neutralization to occur

since Olesen is performing the same method steps as the instantly claimed invention. Additionally, the skilled artisan would reasonably expect neutralization to occur since it is well known in the art, as evidenced by King, for example, that a basic solution is neutralized by the addition of an acid. In reference to timing of addition of the neutralizing chemical to the rinse, refer to the explanation of Fig. 9 of Olesen, as previously discussed.

10. Applicant argues that the secondary reference of Kennison fails to teach the addition of a neutralizing chemical liquid to neutralize the cleaning chemical after the predetermined period of time has elapsed and during the continuous feeding of the pure water. The secondary reference of Kennison is relied upon to teach measuring the resistivity of the rinse bath.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on M-W 6:30-4:00pm, alternating Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/645,773
Art Unit: 1792

Page 9

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Sharidan Carrillo
Primary Examiner
Art Unit 1792

bsc



SHARIDAN CARRILLO
PRIMARY EXAMINER